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SUMMARY

Descrambling encrypted programming is almost always accomplished in a single unit that also converts "phantom" cable channels into broadcast channels that can be received on regular TV sets. This being the case, in Continental's view the so-called cable "converter box" is often mistakenly blamed for preventing consumers from being able to watch one program while taping another, taping consecutive programs on two different cable channels and inhibiting certain advanced picture generation features such as "picture in picture."

TV receivers are required by Commission regulation to be able to pick-up certain specified broadcast frequencies. Reciprocally, cable systems are required by current Commission regulation to provide a signal that is receivable on such standard broadcast receivers. To comply with the Commission's rules, cable systems that use non-standard frequencies to expand their channel capacity must supply a converter if the consumer's TV set cannot intrinsically access those channels. The converter box, therefore, is an outgrowth of more than 50 years of Commission policies designed to protect the consumers' investment in television receiving apparatus while at the same time fostering technological innovation, policies which Continental urges the Commission to continue. The converter has allowed cable customers to benefit from functionalities not commonly available in TV receivers: superior tuning capabilities; shielding against direct pickup interference; reception of all

cable channels on any TV receiver, however old; remote control/remote volume; convenient purchase of pay-per-view and optional programming; parental control by easy blocking of channels. Another result has been that cable systems can and do use a variety of technologically innovative methods to generate "phantom" channels and provide viewers with ever increasing program choice.

In the meantime, TV manufacturers began providing enhanced "cable ready" tuners capable of receiving many of the "phantom" cable channels without the need for a converter box. Since no standard defined the label "cable ready," many so-called "cable ready" sets still need a converter box. Even truly "cable ready" sets may not remain "cable ready" when a consumer moves to a new system or when the cable system upgrades its distribution plant. In reality, today's analog "cable ready" TV set will shortly need a digital decompression converter. Therefore, any steps to create a "no box" world are transient. If TV technology is permitted to flourish, there will always be an installed base of TV sets and VCR's that need a "box" to be compatible with an advancing distribution system.

In Continental's view, scrambling is not, in and of itself, the sole cause of consumer discontent over compatibility issues. However, scrambling does contribute to this problem and there are several ways such problems can be mitigated or eliminated entirely without any restriction on the practice of scrambling.

Scrambling is, after all, essential to secure cable programming from theft. Theft presents lost revenues of \$4.7 billion annually -- about 25% of the industry's total subscription revenues. Traps are too readily defeated by thieves, and do not provide the programming flexibility consumers want. Traps increase the need for service calls, limit channel changes, introduce degradation, and if mandated would impose \$6 billion of cost in the first year of deployment alone. Addressable traps suffer from severe operational inflexibility because they rarely control more than four channels and are generally not reliable. Interdiction is extremely expensive -- it must be installed in every home, regardless of channels subscribed to, and if mandated would cost the industry \$18 billion to install. Continental believes that a universal scrambling standard placed in the receiver would instantly be a target for organized decryption and would defeat the cable industry's ability to upgrade security from time to time.

Continental recognizes, however, that scrambling is not a perfect solution and deploys it only in those markets, and to the extent that it is needed to prevent theft. Due to costs associated with scrambling, market forces dictate that scrambling be done only to the point where revenues are protected, and no more. Consequently, at Continental the degree of scrambling varies widely as does theft. This is a market-driven balance between consumer friendliness and security which satisfies the Act's reliance on market solutions. It also affords cable

operators the same security choices available to wireless cable, video dial tone, and other competitors.

In Continental's experience, the various "compatibility" problems identified in the NOI are most often due to a failure by equipment vendors to properly instruct consumers on the proper way to install and use TV's, VCR's, and other home video systems, not scrambling. For example, if a VCR is connected upstream of a converter/descrambler, a customer may tape any non-scrambled program while viewing any other program, whether scrambled or not. However, if the VCR is connected downstream of the converter -- as is typically done when a cable customer installs a VCR after subscribing to cable -- that ability is lost. A simple change will restore this taping and viewing option.

Scrambling does, of course, occasionally impose limitations on the relatively small number of customers who wish to tape one scrambled program while viewing another scrambled program, but this problem can be easily fixed by providing those customers with either two descramblers or one dual-output descrambler. Other reported problems can actually be cured with various "smart" remote controls. Picture in Picture (PIP) features are more problematic because there is no method standard among manufacturers for generating PIP. Even so, most picture in picture features will work on cable if the consumer's equipment is installed properly and/or if an additional descrambler is provided.

We question who ultimately would benefit if all TV functionalities were placed in the TV receiver. In audio equipment, one need not discard the receiver or speakers when adding a CD player. In home computing, one can replace a keyboard without replacing the monitor. In a world where all functionalities are in the receiver, any transport innovation would require the customer to replace a functioning receiver in order to obtain an newer functionality. That would benefit foreign manufacturers, but not the consumer nor American industry.

Continental does not object to subscribers owning certain reception equipment including remote control devices and converter boxes, but Continental opposes allowing consumers to own or third-parties to sell descrambling equipment. The 1992 Act does not require that descrambling functions be turned over to third-party suppliers or to TV and VCR manufacturers. The Act only requires that subscribers be provided opportunities to obtain converters from third-party suppliers. There is no more reason to make descrambling circuitry available to third-party suppliers than there is to make banknote stock available in copyshops. Continental encourages the Commission to establish standards for equipment point-of-sale which not only properly define "cable ready" and the proper way to hook up the devices, but disclose to customers the limited expected useful life of new analog reception equipment.

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life of the average TV receiver can easily exceed 15 years. One consequence of the long life of TV receivers has been that the embedded base of television receivers has not kept up with the many technological advancements made over the years in television distribution technology.

The "standard" for television broadcasting, distribution and reception in the United States was established by the Commission in 1941. Since then, the Commission has from time to time imposed additional standards to accommodate the many ensuing technological innovations. For a variety of public policy reasons, including the desire to protect the consumer's prior investment in reception apparatus, the standards have always required that new technologies not render obsolete the existing installed base of consumer equipment. The Commission initially awarded only VHF frequencies for use by television broadcasters. Later, UHF frequencies were added. Existing VHF sets required a UHF "converter" box to be able to receive the new UHF signals. When cable television was introduced, the existing 68 broadcast channels were more than sufficient. But as cable developed, using only those portions of the spectrum allocated to broadcast television proved a limitation.

The broadcast television spectrum is not continuous. There is a small gap between channels four and five, a larger gap between channels six and seven and a still larger gap between channels 13 and 14. These portions of the spectrum are used by other services such as FM radio broadcasting.

Since cable does not radiate its signal, cable systems that needed additional channel capacity began to make use of the spectrum gaps between the traditional broadcast channels. Six MHz "phantom" cable channels were inserted in these gaps in sections known as mid-band, super-band, and hyper-band. Because standard TV receivers could not pickup such "phantom" channels, a converter was required to shift those "phantom" channels to a frequency the set could receive.

Although such cable channelization systems became common, they were by no means "standard." Because of interference problems, in some locations not all of the possible "phantom" channels were usable. In other areas, the carrier frequencies of certain "phantom" channels were shifted slightly to further avoid interference. As a result, different cable systems often use different approaches and technologies to generate "phantom" cable channels. For example, one approach uses Harmonically Related Carriers (HRC), while another method uses Incrementally Related Carriers (IRC). Nonetheless, those cable systems furnish the converters that are required by customers to enable reception on standard broadcast receivers. Consumers benefit greatly from the fact that converters extend the life of their present TV receivers -- consumers do not have to throw out their old sets and buy new ones to keep up to date with changes in distribution technology.

Although cable channelization technologies are not "standard," TV set makers wishing to capitalize on cable's

growing popularity began making tuners that could receive most (if not all) of the existing "phantom" cable channels as if those channels were standard broadcast channels. As cable distribution technology further advanced, "phantom" channels above UHF channel 68 were added -- ultra-band.

TV set makers produced receivers that could variously receive only some of the "phantom" cable channels (such as mid-band and super-band channels). Even so, such sets were commonly labeled "cable ready." Other manufacturers produced sets capable of receiving cable's ultra-band and some produced sets that could receive cable's hyper-band. In each case, manufacturers could arguably label such sets as "cable ready," regardless of which cable channelization technology the set could actually accommodate.

As a consequence, the term "cable ready" has been misused (and, as a result, devalued) over the years as television set and VCR makers have sought the competitive advantage of being compatible with the most popular television distribution system - cable. TV sets and VCR's that are labeled as "cable ready" undoubtedly outsell those that are not so labeled. Unfortunately, there has been no standard for such labeling. Since every receiver sold in the U.S. must be able to receive over-the-air VHF and UHF broadcasts, and since all cable systems regardless of the distribution methods employed must provide a signal that is receivable on any standard TV set, theoretically all television sets sold in the U.S. are "cable ready."

B. Cable Distribution Technology Has Evolved Very Rapidly

Television receivers don't "evolve" after purchase; at best, they keep functioning with whatever technology was originally built into them. Since television sets don't "improve" after manufacture, all sets are eventually outdated by external changes in distribution technology. Although standard broadcast receivers suffer from serious technological limitations, in 1972, the Commission wisely refrained from limiting cable distribution technology to the downstream transport of standard broadcast channels. Instead, the Commission required the delivery of output signals which could be received on any standard TV receiver,¹ just as it had done with the prior revolution in color transmission.² One of the tangible results of this policy has been the cable converter, which simultaneously preserved the consumer's investment in broadcast receivers while allowing cable operators the flexibility to leap from 330 MHz to 750 MHz and beyond without having to wait out the TV receiver replacement cycle.

C. Converters Overcome The Substantial Limitations Of The Current Embedded Base Of TV Receivers

Even today, cable converters offer significant advantages to the vast majority of consumers, even beyond expanded channel capacity. The embedded base of TV receivers suffers numerous limitations, including:

¹Cable Television Report & Order, 36 FCC2d 143, 200 (1972).

²Color TV Transmissions, 41 FCC 658 (1953).

Broadcast Only Tuners: Although most new TV's and VCR's provide some degree of "cable ready" tuning, the vast majority of sets in use have tuners capable of receiving only standard broadcast channels.

Poor Shielding. Many receivers have poor internal shielding, which results in direct pickup interference from nearby broadcast towers. For example, Continental's Newton, Mass., system serves an area in proximity to the towers used by Boston broadcasters. Since most TV's and VCR's have plastic

1 GHz channel plans due to interference from the additional intermediate frequency (IF) used to demodulate the signals.

VCR Limitations. VCR's suffer similar limitations. Like many so-called "cable ready" receivers, some VCR's are "compatible" only with the channelization plan of a particular manufacturer, and may not be compatible (without a converter) with the particular channelization methods used by the cable system to which the VCR is connected. For example, a "cable ready" VCR that cannot tune to ultra band or hyper band frequencies will require a converter if the cable system to which the VCR is connected uses those frequencies.

Far from being a source of incompatibility, converters are the means by which a vast majority of the 195 million TV receivers and many of the more than 72 million VCR's in U.S. households are made "compatible" with cable channels. [Source of figure: A.C. Nielsen, U.S. Census Bureau] In a world with an embedded base of receivers with varying functionalities, converters allow for a host of consumer benefits:

- Extending the life of TV receivers by replacing obsolete built-in tuners.
- Superior tuner compared with standard TV receivers
- Shielding against direct pickup interference
- Reception of all cable channels on any TV receivers
- Remote control/remote volume on non remote controllable

D. Restricting Converters Will Not Provide "Compatibility" Without Massive Consumer Investment Or A Halt In Subsequent Innovation

In Continental's view, restricting converters in order to "assure compatibility" would benefit only the narrowest set of customers: those who have purchased TV receivers within the last six months to one year. Even these customers will soon find their sets obsolete and in need of a converter box, as the world moves to 1 GHz and beyond or to digital compression.

The only way one could assure perfect compatibility and a "no box" world would be to force all consumers to continually buy the latest in TV receivers or to outlaw all technological progress. Obviously, neither Congress nor the Commission would impose such an absurd result.

II. Effects of Scrambling on Receiver/VCR Functionality

While many TV's and VCR's require and indeed benefit from converters that transform "phantom" cable channels into standard broadcast channels, sometimes cable channels are also scrambled to reduce the occurrence of signal theft. Such scrambling is functionally distinct from converting "phantom" cable channels to standard broadcast channels, but it is sometimes accomplished in one unit: the converter/descrambler. Due to costs associated with scrambling, market forces dictate that scrambling be done only to the point where revenues are protected, and no more. Consequently, the degree of scrambling varies widely as does theft. See Section III below.

A. Consumer Problems With Cable "Compatibility" Do Not Arise From Non-Scrambled Channels

For most customers, the presence of a converter/descrambler does not cause problems. The devices offer all of the benefits noted above, and correctly installed, inhibit few or none of the TV set or VCR's features. Even with a converter, consumers with "cable ready" equipment can watch one program while taping another or use advanced picture in picture features without restriction when viewing or taping non-scrambled channels. Even if one of the channels is scrambled, such features are not inhibited. Problems associated with scrambling occur only when both channels in question are scrambled, aside from the sequential taping problem discussed in Section II. B. 2.

Based on Continental's experience, many of the apparent problems associated with scrambling are actually due to problems with how the TV set, VCR and converter/descrambler are connected; the difficulty consumers have programming some VCR's; and the fact that some "cable ready" TV's and VCR's are not really "cable ready." Indeed, consumers often report such problems on cable systems that don't employ any scrambling or that involve non-scrambled channels. For example, a typical complaint arises from a consumer who has purchased a VCR after cable service is installed. Such customers frequently report problems in taping one show while watching another -- even on channels which are not scrambled. This "problem" arises because the customer has connected the VCR downstream of the converter, rather than upstream. Simple customer education by equipment vendors can

upstream. Simple customer education by equipment vendors can correct such problems. See Appendix A.

B. Most Problems With Scrambled Channels May Be Remedied With Minor Changes

On the other hand, problems can and do occur which actually involve two scrambled channels. However, even when scrambling is the actual cause of the problem, several steps can be taken to alleviate many of these inconveniences.

1. Taping One Program While Watching Another Program

According to Nielsen, half of all taping is done while no other program is being watched.³ Of the remaining half, consumers may watch and record different programs if any of the programs are not scrambled. This problem, therefore, should be rare since Nielsen reports that 65 to 70% of all taping is from broadcast networks, which are almost never scrambled. The only impediment arises when the channel to be taped and the channel to be watched are both scrambled, because most standard devices will only descramble one channel at a time. Rather than reconfiguring the entire distribution system, the most effective solution is to provide a second descrambler to those customers who want the ability to tape one scrambled program while watching another scrambled program.

³ TV Dimensions '93, Media Dynamics, Inc., p.104.

2. Taping Consecutive Programs On Different Cable Channels

Both Scientific Atlanta and General Instrument currently make cable descramblers that allow consumers to tape consecutive programs on different scrambled channels. Where such compatible equipment exists, Continental will make it available to those customers who request it for an additional charge.

Third-party manufacturers, such as Magnavox, make "smart" remote controls that will also allow consumers to do this (depending on the particular remote control technology employed). Such devices are available in retail electronics stores or through catalogs.

However, there does not appear to be enough consumer

~~demand for this feature at present to entice all manufacturers to~~

separate VCR as the source of the second picture. Others such as Sony and Toshiba offer "picture in picture" through a dual tuner built into the set, but some Sony models generate multiple pictures using one tuner and frame store technology. Thus, left open is the question: "With which scheme is cable distribution technology to be 'compatible'?" Even after that question is resolved, the answer would almost immediately be rendered moot by manufacturers offering "picture in picture in picture" features using yet another method.

In any case, cable operators can accommodate many of the current methods used for picture-in-picture generation by providing two descramblers (or by using two-channel descramblers if available from a manufacturer.)

As noted above, much of the perceived "incompatibility" between cable and consumer electronics arises most often from a lack of consumer education about the proper hook-up of various pieces of consumer electronics. The blinking 12:00 AM on the homeowner's VCR is a flashing reminder of the widespread inability of many consumers to deal effectively with the onslaught of new technology. From 25% to 40% of Continental's service calls are for customer education, including proper installation of VCR's and videogames. The Commission is not in a position to compel Nintendo to offer service calls, but it could vastly improve consumer education by requiring equipment vendors to educate customers on the proper configuration of home electronics. Attached as Appendix A are illustrations of proper

installation techniques which the Commission could make publicly available. That alone will help consumers correct "incompatibility" problems, many of which are the consequences of the consumer's own installations, not a result of converters or scrambling.

III. Scrambling Is Essential For Security And To Offer Customer Conveniences

A. The Need For Signal Security

As discussed above, consumer difficulties most often arise, not from converters, but from scrambling or encoding signals for security. Both Congress and the Commission are well aware of the magnitude of signal piracy. The Commission reported on its magnitude, and the 1992 Act upgraded the crime to a felony, doubling the fine and more than doubling the sentence for criminal convictions.

A 1992 survey conducted by the National Cable Television Association's Office of Cable Signal Theft (OCST) concluded that theft of cable TV service costs the nation's cable operators and program networks more than \$4.7 billion annually. The \$4.7 billion in lost revenues represents about 25% of the cable industry's total subscription revenues.

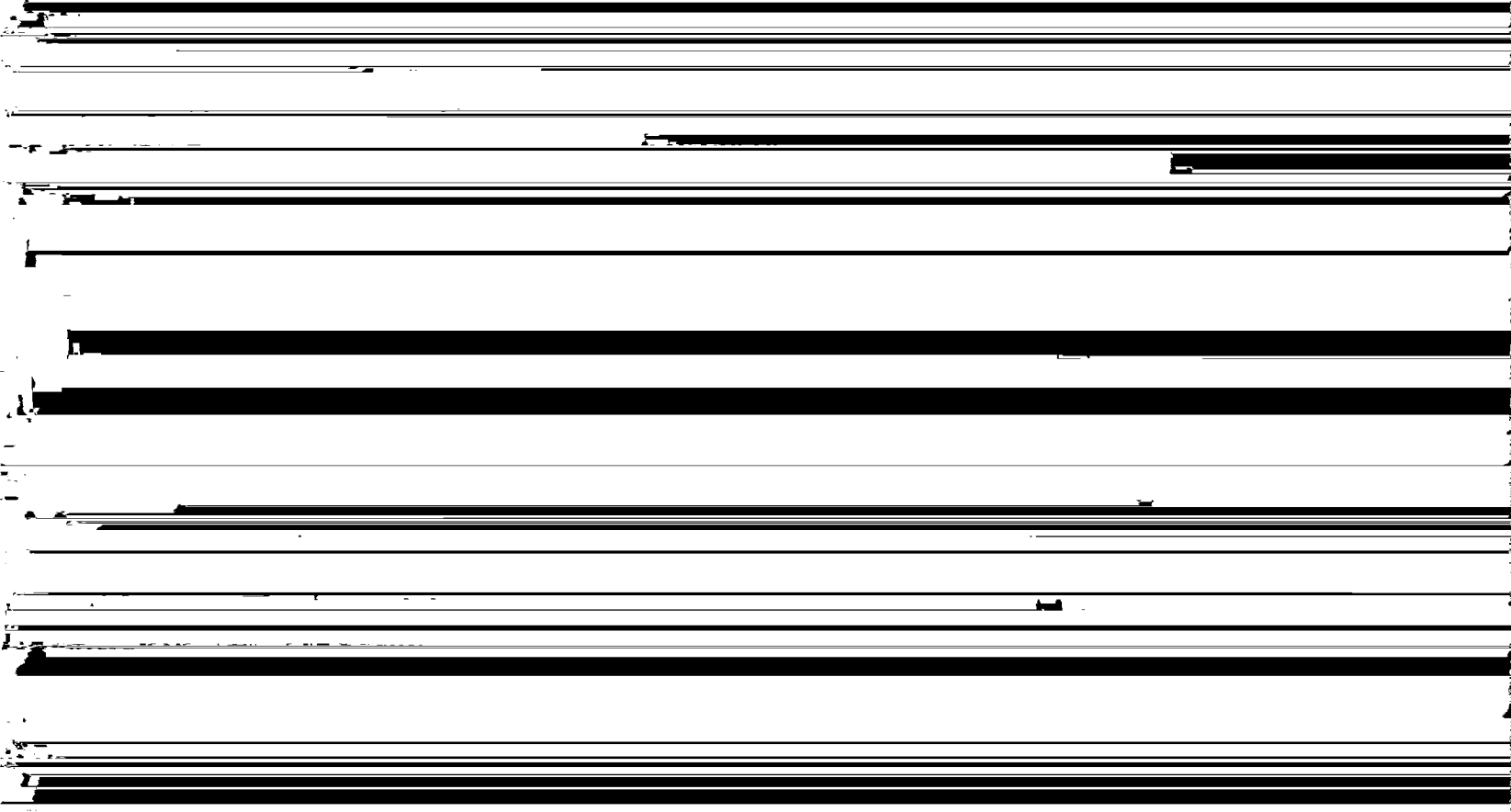
Because of the high price of cable theft for Continental and our paying customers, we have stepped up our security measures in recent years. Scrambling technology plays an integral role in our security program and represents the best and most cost effective method for staying one step ahead of the thieves. Without scrambling, cable signals would be available to anyone

willing to climb a utility pole and hook-in to the cable or disconnect a trap. Indeed, cable thieves have been apprehended in Los Angeles using bucket trucks to connect to the cable distribution system. Besides providing enhanced signal security, scrambling discourages would-be thieves from such extremely

~~dangerous activities. Frustrated in their attempts to steal the~~

newspapers like The Wall Street Journal, USA Today, and The Boston Globe. These distributors utilize sophisticated order processing and product delivery systems to fulfill orders from individual customers or local distributors who buy the devices in larger quantity for resale. See Appendix B.

In November 1992, the Los Angeles Police Department with the investigative support of the Continental security department, conducted raids on several separate locations in L.A. and Las Vegas which resulted in the seizure of more than 70,000 cable boxes destined for the black market. Three tractor trailer trucks were needed to carry the contraband and the business records to a police warehouse for evidentiary processing. LAPD officers in charge of the operation estimated that the distributor was generating approximately \$1.5 million in illegal



dial tone.⁴ Other security measures, such as "traps" can be used to provide some level of security for premium services on the "mid-band" of the channel line-up or tiers of satellite service. However, negative traps can easily be removed or "drilled out" by the more persistent thief and result in higher operational expense for the cable operator, while positive traps only affect a single channel. On the other hand, addressable technology and its scrambling component require a pirate to make a significant investment in a black box, upwards of \$300, which can be rendered useless by an upgrade in the scrambling methodology at the cable operator's head-end. Continental's Westfield, Massachusetts, system noted an improvement in premium service orders when its headend was upgraded to a more secure mode of scrambling.

B. Consumer Benefits From Scrambling

There are reasons other than theft of cable service for the use of scrambling technology and addressable converters. Scrambling assures copyright owners of the integrity of product delivery. If programming is cablecast over what is effectively an unsecured channel, copyright owners could pull back on their release windows for motion pictures, preferring to make their product available first to alternative technologies that can protect their product.

Scrambling technology also provides the addressability

⁴Michigan Bell's "ThinkLink" requires a converter in the home. Communications Daily, March 15, 1993, p.4.

necessary to permit the convenient customer ordering of premium and pay-per-view services without the need for service calls. In a market of impulse purchases and many dual career couples, the need for service calls must be minimized for customer convenience.

As channel capacity expands and new programming services are introduced, Continental is looking to offer more purchasing options for its customers. Scrambling permits Continental to easily provide optional, tiered programming thus promoting consumer choices. Finally, scrambling is necessary to comply with the tier buy-through regulations promulgated in MM Docket 92-262 and, as a practical matter, with the on-channel carriage provisions in MM Docket 92-259.

C. Scrambling Is Already Minimized By Market Forces

While needed to reduce theft, Continental does not regard current scrambling methods as the perfect solution to security, precisely because scrambling has offsetting consumer disadvantages and costs. Continental uses scrambling only where and when necessary to prevent signal theft. Continental, for example, does not employ scrambling in Richmond, Virginia, at all, because of the relatively low theft rate. By contrast, in Los Angeles, California, and Lawrence, Massachusetts, Continental must scramble not only premium services, but tier services and some broadcast services as well, because of the very high theft rate in those markets. The degree of scrambling employed by Continental is at least proportional to the magnitude of the